

REMARKS

By this amendment, applicants have amended claim 11 to clarify that converting the nitrogen oxides in the gas mixture to non-toxic compounds takes place in a homogeneous gas phase reaction by reaction with the vaporized additive. Claim 11 has also been amended to provide antecedent basis for the phrase "gas generating substance" in claim 14. Claims 12 - 15 have been amended to depend from claim 11. Applicants have also added new claims 16 - 25. Claims 16 - 20 recite that the nitrogen oxides reducing substance consists essentially of at least one compound selected from the group consisting of metallocenes, metallocene derivatives, sulfur, and sulfur compounds, while claims 21 - 25 recite that the nitrogen oxides reducing substance consists of at least one compound selected from the group consisting of metallocenes, metallocene derivatives, sulfur, and sulfur compounds. Claims 1 - 10 have been canceled without prejudice or disclaimer.

In view of the cancellation of claims 1 - 10, the rejection of claims 4 - 6 under 35 USC 102(b) at the top of page 3 of the office action and the rejection of claims 1 - 10 under 35 USC 103(a) on pages 5 and 6 of the office action are moot.

Claims 11 - 13 stand rejected under 35 USC 102(b) as allegedly being anticipated by DE 195 05 568A1 to Redecker et al. Claims 11 - 15 stand rejected under 35 USC 102(b) as allegedly being anticipated by or, in the alternative under 35 USC 103(a) as allegedly being obvious of Redecker et al. Applicants traverse these rejections and request reconsideration thereof.

The claims now in the application relate to a method for reducing nitrogen oxides of gas mixtures from pyrotechnic reactions. The method includes carrying out a pyrotechnic reaction of a gas generating substance to generate a gas mixture, vaporizing at least one additive, i.e., a nitrogen oxides reducing substance, by the heat released in the pyrotechnic reaction, and converting nitrogen oxides in the gas mixture to non-toxic compounds in a homogeneous gas phase reaction by reaction with the vaporized additive, i.e., the vaporized nitrogen oxides reducing substance. Claims 11 - 16 recite that the at least one additive is selected from the group consisting of metallocenes, metallocene derivatives, sulfur, and sulfur compounds. Claims 16 - 20 recite that the nitrogen oxides reducing substance consists essentially of at least one compound selected from the group consisting of metallocenes, metallocene derivatives, sulfur and sulfur compounds, while claims 21 - 25 recite that the nitrogen oxide reducing substance consists of at least one compound selected from the group consisting of metallocenes, metallocene derivatives, sulfur and sulfur compounds.

The Redecker et al document is directed to a propellant for gas generators consisting of nitrogen containing compounds. The propellant is characterized by the fact that it contains (a) as a nitrogen-containing compound (fuel) at least one compound from the group consisting of tetrazoles, triazoles, triazines, cyanuric acid, urea, their derivatives, substitution products or salts, (b) as an oxidation agent, at least three compounds from the group consisting of peroxides, nitrates, chlorates or perchlorates, (c) combustion moderators that are suitable for affecting the

combustion and its rate through heterogeneous or homogeneous catalysis, and optionally (d) additives that are suitable for reducing the fraction of toxic gases. The Redecker et al document discloses that the moderators that interfere in the reaction in the form of a homogeneous catalysis are, for example, sulfur, boron, silicon or ferrocene and its derivatives. However, this set of compounds is only one choice for the combustion modifiers, the other being moderators that interfere in the reaction in the form of a heterogeneous catalysis. Moreover, this document envisions the use of another class of additives for reducing nitrogen oxides.

The present inventors have found that some of the compounds employed in the gas producing mixture described in the Redecker et al document as combustion modifiers can be used in a specific manner for reducing nitrogen oxides. In doing so, no further nitrogen oxides reducing substance is necessary. According to the present invention, after vaporizing the nitrogen oxides reducing substance, i.e., metallocenes, metallocene derivatives, sulfur and sulfur compounds, the nitrogen oxides in the gas mixture are converted to non-toxic compounds in a homogeneous gas phase reaction with the vaporized additive. In Redecker et al, there is a clear teaching to use compounds other than metallocenes, metallocene derivatives, sulfur and sulfur compound to reduce nitrogen oxides. See, the second and third full paragraphs of page 7 of the English translation of Redecker et al. In view of this teaching, applicants submit that it cannot be said that the Redecker et al method inherently involves converting nitrogen oxides in the gas mixture to non-toxic compounds in a homogeneous gas phase reaction

with the vaporized combustion modifiers. Moreover, since the Redecker et al document discloses two classes of combustion modifiers, the gas generating composition will not inherently have moderators that interfere in the reaction in the form of a homogeneous catalysis, i.e., sulfur, boron, silicon or ferrocene and its derivatives. Thus, the present invention is not inherent from the teachings of Redecker et al.

As to new claims 16 - 25, it is submitted the Redecker et al document clearly does not suggest a method for reducing nitrogen oxides in which the nitrogen oxides reducing substance consists essentially of or consists of at least one compound selected from the group consisting of metallocenes, metallocene derivatives, sulfur and sulfur compounds. To the contrary, the Redecker et al document clearly suggests the use of other nitrogen oxide reducing substances.

For the foregoing reasons, the presently claimed invention is neither disclosed nor suggested by Redecker et al.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the

deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 306.37599X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

A handwritten signature in black ink, appearing to read 'Alan E. Schiavelli', written over a horizontal line.

Alan E. Schiavelli
Registration No. 32,087

AES/jla
(703) 312-6600